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Synthesis and nonlinear optical properties of pyridoxine-based stilbazole derivatives and their azo-analogs

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Abstract

© 2018, Copyright © Kazan (Volga region) Federal University. The syntheses of a series of novel derivatives of stilbazole and their azo-analogs bearing the phenylalkenyl and phenyldiazenyl substituents at position 6 of the pyridoxine ring are reported. The observed cis/trans regioselectivity in the Wittig reaction between triphenylbenzylphosphonium chloride and carbonyl derivatives of pyridoxine ketal is discussed with respect to transition state intermediates, nature of base used in the reaction, and resonance transformations in the pyridoxine system. The azo-derivatives are obtained by azocoupling of the diazonium salts of sulfanilic or 4-aminophenyl-1,3-disulfonic acids with the corresponding pyridoxine acetals. Nine compounds from the obtained experimental series are capable of emitting second harmonic generation light, although with a reduced efficiency as compared to well known KH2PO4or LiIO3perovskite crystals, but with excellent beam resistance under laser irradiation, which makes them potential starting points for the development of novel nonlinear optical materials.

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Keywords

Azo-derivatives of pyridoxine, derivatives of stilbazole, second harmonic generation

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